MITSUBISHI
PROGRAMMABLE CONTROLLERS
MELSEC-F

Art.No. 141178 *Changes for the Better*
Version A
JY997D00401
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FX2N

FX2N/FX2NC FUNCTION EXPANSION MEMORY

HARDWARE MANUAL

JY997D00401A

This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of the FX2N/FX2NC Function Expansion Memory. It should be read and understood before attempting to install or use the unit. Further information can be found in the FX2N or FX2NC series PLC hardware manuals.

Guidelines for the safety of the user and protection of the FX2N/FX2NC Function Expansion Memory

- If in doubt at any stage during the installation of the FX2N/FX2NC Function Expansion Memory always consult a professional electrical engineer who is qualified and trained to the local and national standards. If in doubt about the operation or use of the FX2N/FX2NC Function Expansion Memory please consult the nearest Mitsubishi Electric distributor.
- Under no circumstances will Mitsubishi Electric be liable or responsible for any consequential damage that may arise as a result of the installation or use of this equipment.
- All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- Owing to the very great variety in possible application of this equipment, you must satisfy yourself as to its suitability for your specific application.

Note's on the symbology used in this manual

At various times through out this manual certain symbols will be used to highlight points of information which are intended to ensure the user's personal safety and protect the integrity of the equipment. Whenever any of the following symbols are encountered, its associated note must be read and understood. Each of the symbols used will now be listed with a brief description of its meaning.

Hardware warnings

1) Indicates that the identified danger WILL cause physical and property damage.

2) Indicates that the identified danger could POSSIBLY cause physical and property damage.

Associated Manuals

	Manual name	Manual number	Description
⊙	FX1S/FX1N/FX2N/FX2NC Programming Manual II	JY992D88101 (sent separately)	Explains the instructions in the FX1S/FX1N/FX2N/FX2NC Series PLC.
○	FX2N Hardware Manual	JY992D66301 (included with product)	Describes the contents related to the hardware such as specification, wiring and mounting of the FX2N Series PLC.
○	FX2NC Hardware Manual	JY992D76401 (included with product)	Describes the contents related to the hardware such as specification, wiring and mounting of the FX2NC Series PLC.

⊙: Indispensable manual
○: Either manual is necessary

1. Product Outline

1.1 Features

FX2N-ROM-E1 and FX2NC-ROM-CE1 are optional memories for the FX2N or FX2NC Series PLC to add external ROM instruction.
In the products, system programs to add external ROM instruction, EXTR (FNC 180), and the EEPROM memory which can be used as a PLC program area are built in.

1.2 Programming Tools Applicable for EXTR (FNC 180) Instruction

Model name	Version
GX Developer	SW7 or later
FX-PCS/WIN-E	3.10 or later
FX-10P-E	4.10 or later
FX-20P-E (FX-20P-MFXD-E)	5.10 or later

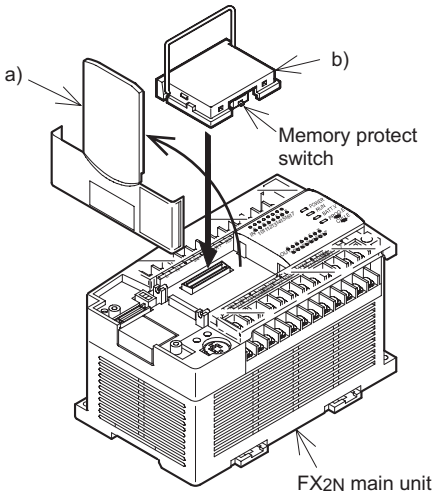
2. Specifications

Model name		FX2N-ROM-E1 function expansion memory cassette	FX2NC-ROM-CE1 function expansion memory board
Applicable PLC		FX2N PLC version 3.00 or later (Serial number 15**** or later)	FX2NC PLC version 3.00 or later (Serial number 15**** or later)
		If installed in PLC earlier than version 3.00, only 16k-step user program memory and clock function can be used.	
Built-in functions	System memory	Equipped with functions K10 to K13 of the EXTR (FNC 180) instruction • K10: Inverter operation monitoring • K11: Inverter operation control • K12: Read of inverter parameter • K13: Write of inverter parameter	
	User program memory	• Memory capacity: 16k steps (can be set to 2k, 4k or 8k steps also) • Memory type: EEPROM • Allowable number of write: Approx. 10k times (memory protect switch provided)	
	Clock function	Not provided (clock is built in PLC)	• Year 1980 to 2079 • Year display in 2 or 4 digits • Monthly difference of ±45 sec. (at 25°C)

3. Installation and Operation

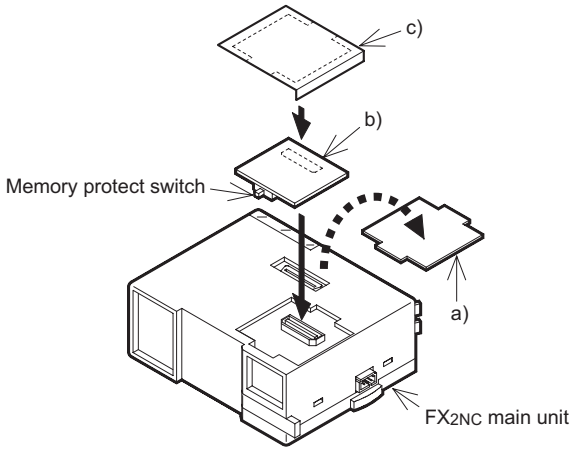
- Don't attach/remove the memory cassette or memory board before turning off the power. Attaching/removing it while the power is on may damage its contents or element.
- Don't touch the memory cassette or memory board before discharging static from the body of the user. When transporting, make sure to wrap it in a static-free sheet to prevent damaging its contents or element.

3.1 Installation of FX2N-ROM-E1



1) Turn off the power of the PLC and remove the cover "a)".
2) Install FX2N-ROM-E1 "b)" to the port on the main unit.
3) Put back the cover "a)".

3.2 Installation of FX2NC-ROM-CE1



1) Turn off the power of the PLC and remove the cover "a)".
2) Install FX2NC-ROM-CE1 "b)" to the port on the main unit.
3) Place cover "c)", included in the memory board product box, onto the PLC.

3.3 Operation

- The program error may flash when used for the first time because the EEPROM (user program memory) is not initialized. In the personal computer or FX-20P (off-line mode), transfer and write a program in that status. In the FX-10P or FX-20P (online mode), execute all NOP write to erase the contents.
- After writing a program, make sure to verify.
- Set the memory protect switch to OFF before writing a program. During normal operation, it is recommended to set it to ON to prevent erroneous write.
- When installed in the FX2N or FX2NC Series PLC version 3.00 or later, the EXTR (FNC 180) instruction and the 16k-step EEPROM and clock function can be used.
  If installed in the FX2N or FX2NC Series PLC earlier than version 3.00, only the 16k-step EEPROM and clock function can be used.

4. Inverter Communication Function

- When handling the PLC or inverter, follow the notices indicated in each manual which is included with the main unit in order to avoid electric shock, fire, a damage or an accident.

- Make sure to perform class D grounding of the ground terminal of communication equipment for the PLC together with that of the PLC main unit. Ground the shield of a shielded cable at one point on the PLC. Do not, however, ground at the same point as high voltage line. If grounding is imperfect, effects of noise or surge induction takes place, and it may cause a communication error or erroneous operation.
- The signal cables must not be laid near or bundled with the main circuit lines, high voltage power cables or load carrying wires. Otherwise effects of noise or surge induction are likely to take place, and it may cause a communication error or erroneous operation.
  Keep a safe distance of more than 100mm (3.94") from these wires.

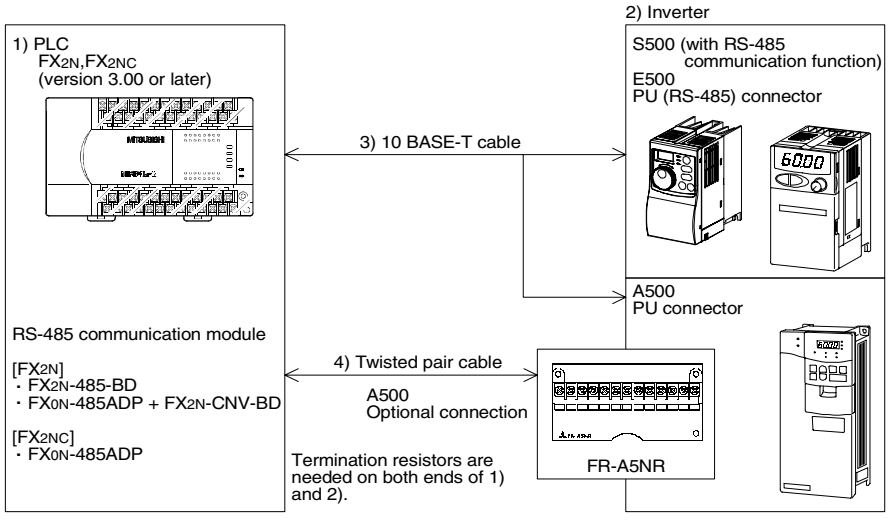
4.1 Outline of Functions and System Configuration

When using K10 to K13 of the EXTR (FNC 180) instruction, operation monitoring, control value write or parameter monitoring and change in the A500/E500/S500 (with RS-485 communication function) Series MITSUBISHI TRANSISTORIZED INVERTER can be performed.
The details of programming and setting can be found in the Programming Manual II, JY992D88101.

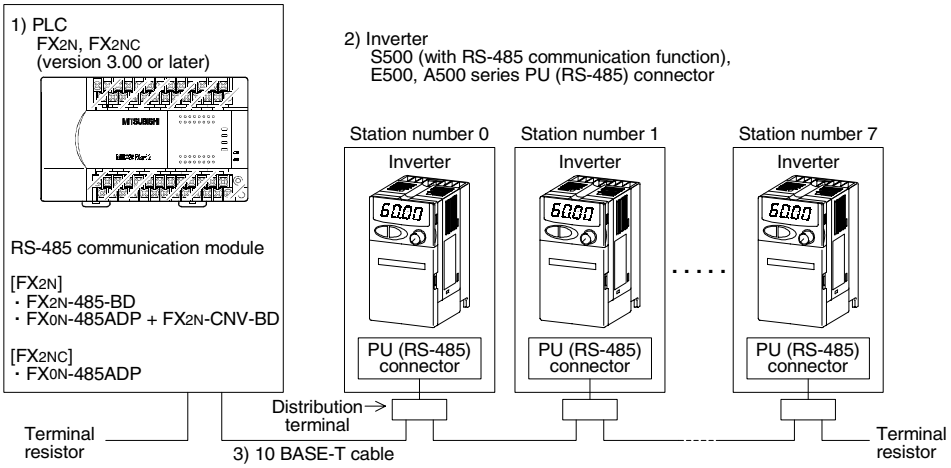
- **Total extension distance**

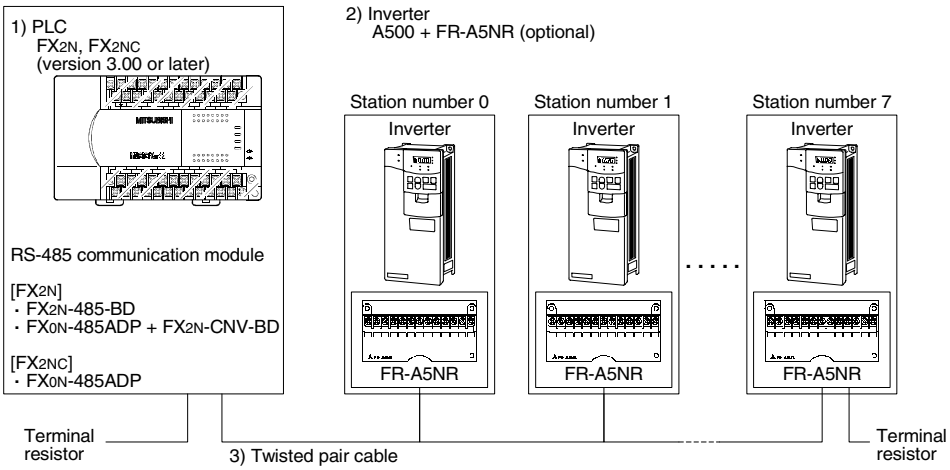
PLC	Using interface	Extension distance
FX2N	FX2N-485-BD	Maximum 50m (164')
	FX2N-CNV-BD + FX0N-485ADP	Maximum 500m (1640')
FX2NC	FX0N-485ADP	

- **Connecting with one inverter**



- **Connecting with two or more inverters (Maximum 8 inverters)**



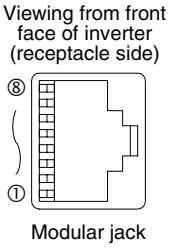


4.2 Wiring

Wiring for PU (RS-485) Connector

- **Pin layout of PU (RS-485) connector**

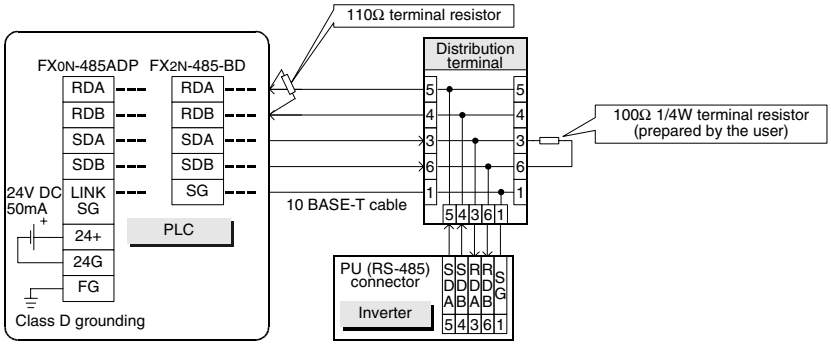
Pin number	Signal name	Note
1	SG	
2	P5S	Not to be used
3	RDA	
4	SDB	
5	SDA	
6	RDB	
7	SG	
8	P5S	Not to be used



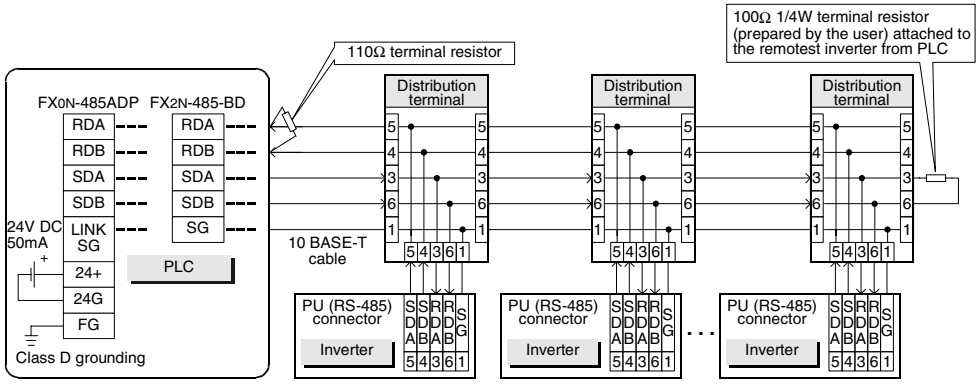
Caution:

The pin number 2 and 8 are for the power supply for an operation panel or parameter unit. DO NOT use when connecting two or more inverters.

- **Connecting with one inverter**



- **Connecting with two or more inverters (Maximum 8 inverters)**



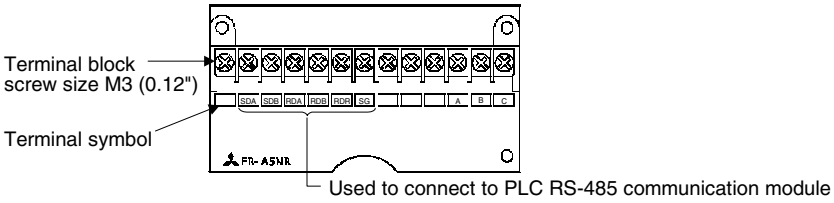
- **Applicable equipment**

  Use the connectors and cables for LAN (10 BASE-T) available on the market.

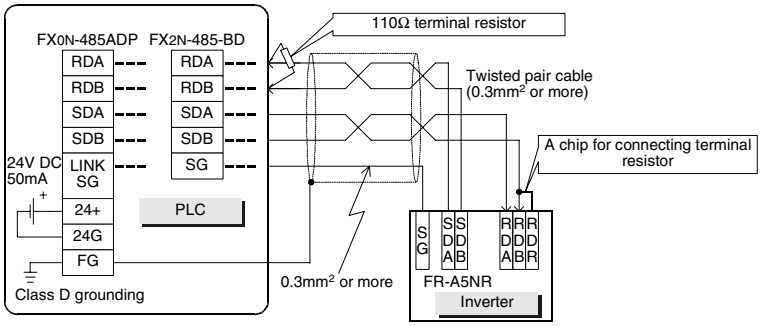
  - Connector: RJ45 connector
  - Cable: Cable conforming to EIA568 (such as 10 BASE-T cable)
  - Terminal resistor: On the PLC side, 110Ω
    On the inverter side, 100Ω and 1/4W prepared by the user

Wiring for FR-A5NR

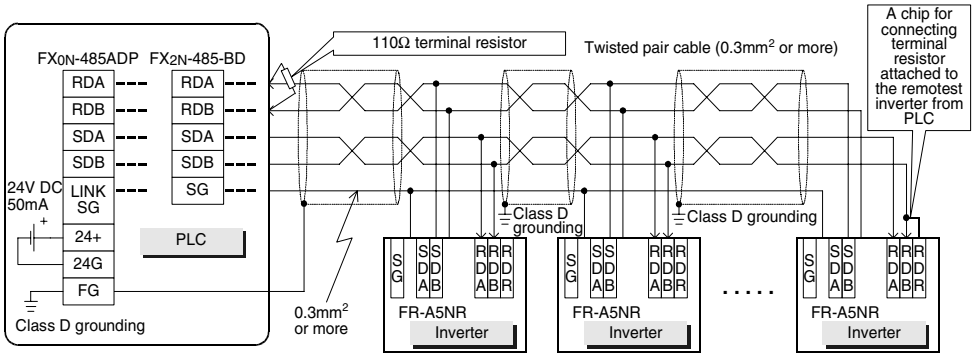
- **Terminal layout**


Terminal block screw size M3 (0.12")
Terminal symbol
SDA SDB RDA RDB RDR SG A B C
FR-A5NR
Used to connect to PLC RS-485 communication module

- **Connecting with one inverter**



- **Connecting with two or more inverters (Maximum 8 inverters)**



- **Applicable equipment**

  - Cable: Use the twisted pair cables (0.3mm2 or more, 3 pairs)
  - Terminal resistor : On the PLC side, 110Ω
    On the inverter side, a chip for connecting terminal resistor only to the remotest FR-A5NR from the PLC (between RDB and RDR)

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MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE : MITSUBISHI DENKI BLDG MARUNOUTI TOKYO 100-8310 TELEX : J24532 CABLE MELCO TOKYO
HIMEJI WORKS : 840, CHIYODA CHO, HIMEJI, JAPAN